REMARKS/ARGUMENTS

1. Claim Amendments

The Applicants have amended claims 40-41, 49, 58-59 and 67. Applicants respectfully submit that no new matter has been added. Accordingly, claims 37-72 are pending in the application. Favorable reconsideration of the application is respectfully requested in view of the foregoing amendments and the following remarks.

2. Claim Rejections – 35 U.S.C. § 101

Claims 55-72 under 35 U.S.C. § 101 because, according to the Examiner, the claimed invention is directed to non-statutory subject matter. The Examiner states:

> The controller of claims 55-72 disclose a queue buffer controller, which applicant defines as software in the specification (page 18, lines 25-32). Software applications, logic, and elements alone are non-patentable subject matter. Claims 55-72 are performed entirely in software "threads" which are not a machine, article of manufacture, process, or composition of matter.

Applicants respectfully traverse the rejection. Claim 55 provides (emphasis added):

> 55. A queue buffer controller for controlling a queue buffer in a data unit transmission device, the queue buffer being arranged to queue data units in a queue and being connected to a link, comprising:
> a queue length determinator for determining a value of a length parameter (QL, QLav) related to the length of the queue, a comparator for comparing the value with a length threshold value (Lth);
> a congestion notifier for performing a congestion notification procedure if the value is greater than the length threshold value; and
> a threshold adaptor for automatically adapting the length threshold value (Lth) by estimating a link capacity value (LC) based on the data rate (DR) of the link and adapting the length threshold value (Lth) on the basis

> of the estimated link capacity value, wherein the threshold adaptor is operable in one of at least a first and a second adaptation mode, the first adaptation mode being associated with minimizing queuing delay and adapting the threshold value (Lth) on the basis of n*LC, where LC represents the estimated link capacity value and n>=1, and the second adaptation mode being associated with maximizing utilization and adapting the threshold value (Lth) on the basis of m*LC, where m > 1 and m > n.

First, the claims themselves refer to components, not software threads. These non-software related elements are supported by Figure 1 and the discussion of Figure 1. Page 18, lines 25-32, which are cited by the Examiner, provide:

> ...which larger method has more steps and procedures, but where these additional steps and procedures are not shown as they do not pertain to the present invention. The methods of Fig. 2 and 4, just as all method embodiments of the invention, may be implemented as software, where steps S1-S3 can e.g. be implemented in one thread, while 85 can be implemented in another independent thread. Step 84 can be implemented in yet another independent thread. (emphasis added)

Notably, this provision does not say that these steps MUST or SHALL be implemented, but MAY be implemented as software. The Examiner's reconsideration of these claims is also respectfully requested.

3. Claim Rejections – 35 U.S.C. § 112

Claims 40, 41, 49-54, 58-59, 67-70 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicants have amended Claims 40-41, 49, 58-59 and 67 to overcome the rejection.

4. Claim Rejections – 35 U.S.C. § 102(b)

Claims 37 and 55 stand rejected under 35 U.S.C. 102(b) as being anticipated by Meyer et al (EP 1249972 A1). The Applicants respectfully traverse the rejection. Meyer fails to disclose at least the element of:

> ...wherein the automatic threshold adaptation procedure is operable in one of at least a first and a second adaptation mode, the first adaptation mode being associated with minimizing queuing delay and adapting the threshold value (Lth) on the basis of n*LC, where LC represents the estimated link capacity value and n>=1, and the second adaptation mode being associated with maximizing utilization and adapting the threshold value (Lth) on the basis of m*LC, where m > 1 and m > n.

The Examiner cites paragraphs [0062] and [0066] of Meyer for this element:

> [0062] In accordance with the present embodiment, which uses two thresholds min_{th} and max_{th}, the adaptation procedure of step S4 (Fig. 2, 3) or S41 (Fig. 4a) consists in first estimating the link capacity LC according to the equation:
>
> $$LC = (RTTWC+RTT) \cdot DR$$
>
> where DR is the data rate of the link, RTT is the round trip time of the link, and RTTWC is a predetermined constant. Then the lower threshold min_{th} is determined as a function of the estimated link capacity LC, for example is set equal to said estimated link capacity LC, or set equal to said sum of LC and another predetermined constant e. Finally, the upper threshold max_{th} is set equal to the sum of min_{th} and a further predetermined constant.
>
> [0066] Finally, regarding the third constant for calculating max_{th}, this third constant is preferably a small number of data units, e.g. 3 to 6 data units. If min_{th} and max_{th} are expressed in numbers of data units, then it is sufficient to add an integer in the range of 3-6 to min_{th} in order to determine max_{th}, and in the case that min_{th} and max_{th} are represented as data amounts (in bytes or bits), then the third constant will be determined as a predetermined data unit size (such as the maximum segment size)

measured in an amount of data, multiplied by an integer in the range of 3-6.

As noted above, Meyer discloses a mechanism to determine the active queue management (AQM) thresholds based on the round trip time and the instantaneous data rate. Said thresholds are the minimum and maximum thresholds which are typically associated with different drop probabilities. The AQM mechanism uses both these thresholds at a time. More precisely, it determines the instantaneous drop probability from the current queue fill state "Q" by interpolating between P(min) and P(max). Furthermore, the thresholds min_{th} and max_{th} are adapted to the instantaneous data rate or namely to the instantaneous link capacity (LC). The present invention, as claimed, builds upon Meyer and claims, in addition, that the conversion from LC to min_{th} and max_{th} could be made adaptive as well. Note that Applicants disclose one or more "a length threshold values," (equivalent to min_{th} and max_{th}) that can be computed based on said first or second adaptation mode of operation. The adaptation mode of operation can either be configured or by a mode selection function (as further claimed). The objective of the present invention, not contemplated by the cited reference, is to make the queue management algorithm less aggressive if, for example, other sources of packet loss have been detected. Hence, while Meyer discloses one mode for determining drop thresholds min_{th} and max_{th}, the present invention contemplates, and claims, multiple modes and a mechanism for choosing the appropriate mode depending on additional conditions.

5. Claim Rejections – 35 U.S.C. § 103 (a)

Claims 38-39, 42, 44-52, 56-57, 60, and 62-70 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Meyer et al in view of Hadi Salim et al (6,535,482). As noted above, with respect to claim 37, from which claims 38-39, 42 and 44-52 depend, and with respect to claim 55, from which claims 56-57, 60 and 62-70 depend, Meyer fails to disclose or suggest at least the element of:

> ...wherein the automatic threshold adaptation procedure is operable in one of at least a first and a second adaptation mode, the first adaptation mode being associated with minimizing queuing delay and adapting the threshold value (Lth) on the basis of n*LC, where LC represents the estimated link capacity value and n>=1, and the second adaptation mode being associated with maximizing utilization and adapting the threshold value (Lth) on the basis of m*LC, where m > 1 and m > n.

Hadi Salim fails to overcome the deficiency of Meyer. Claims 38-39, 42 and 44-52 depend from claim 38 and recite further limitations in combination with the novel elements of claim 38. Therefore, the allowance of claims 38-39, 42 and 44-52 is respectfully requested. Claims 56-57, 60 and 62-70 depend from claim 55 and recite further limitations in combination with the novel elements of claim 55. Therefore, the allowance of claims 56-57, 60 and 62-70 is respectfully requested.

Claims 43 and 61 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Meyer et al in view of Hadi Salim et al as applied to claim 42 above, and further in view of Kawaguchi (5,729,530). As noted above, with respect to claim 37, from which claim 43 depends, and with respect to claim 55, from which claim 61depends, Meyer fails to disclose or suggest at least the element of:

> ...wherein the automatic threshold adaptation procedure is operable in one of at least a first and a second adaptation mode, the first adaptation mode being associated with minimizing queuing delay and adapting the threshold value (Lth) on the basis of n*LC, where LC represents the estimated link capacity value and n>=1, and the second adaptation mode being associated with maximizing utilization and adapting the threshold value (Lth) on the basis of m*LC, where m > 1 and m > n.

Hadi Salim and Kawaguchi fail to overcome the deficiency of Meyer. Claim 43 depends from claim 38 and recites further limitations in combination with the novel elements of claim 38. Therefore, the allowance of claim 43 is respectfully requested. Claim 61 depends from claim 55 and recites further limitations in combination with the

novel elements of claim 55. Therefore, the allowance of claim 61 is respectfully requested.

Claims 53, 54, 71, and 72 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Meyer et al in view of Hadi Salim et al as applied to claim 52 above, and further in view of Takada et al (2002/0089931). As noted above, with respect to claim 37, from which claims 53-54 depend, and with respect to claim 55, from which claims 71-72 depend, Meyer fails to disclose or suggest at least the element of:

> ...wherein the automatic threshold adaptation procedure is operable in one of at least a first and a second adaptation mode, the first adaptation mode being associated with minimizing queuing delay and adapting the threshold value (Lth) on the basis of n*LC, where LC represents the estimated link capacity value and n>=1, and the second adaptation mode being associated with maximizing utilization and adapting the threshold value (Lth) on the basis of m*LC, where m > 1 and m > n.

Hadi Salim and Takada fail to overcome the deficiency of Meyer. Claims 53-54 depend from claim 38 and recite further limitations in combination with the novel elements of claim 38. Therefore, the allowance of claims 53-54 is respectfully requested. Claims 71-72 depend from claim 55 and recite further limitations in combination with the novel elements of claim 55. Therefore, the allowance of claims 71-72 is respectfully requested.

6. Prior Art Not Relied Upon

In paragraph 13 on page 24 of the Office Action, the Examiner stated that the prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Cieslak et al (5,402,416) is cited for containing multiple buffers and managing queues in a switching environment. Cieslak fails to disclose the elements missing from Meyer.

CONCLUSION

In view of the foregoing remarks, the Applicant believes all of the claims currently pending in the Application to be in a condition for allowance. The Applicant, therefore, respectfully requests that the Examiner withdraw all rejections and issue a Notice of Allowance for all pending claims.

The Applicant requests a telephonic interview if the Examiner has any questions or requires any additional information that would further or expedite the prosecution of the Application.

Respectfully submitted,

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